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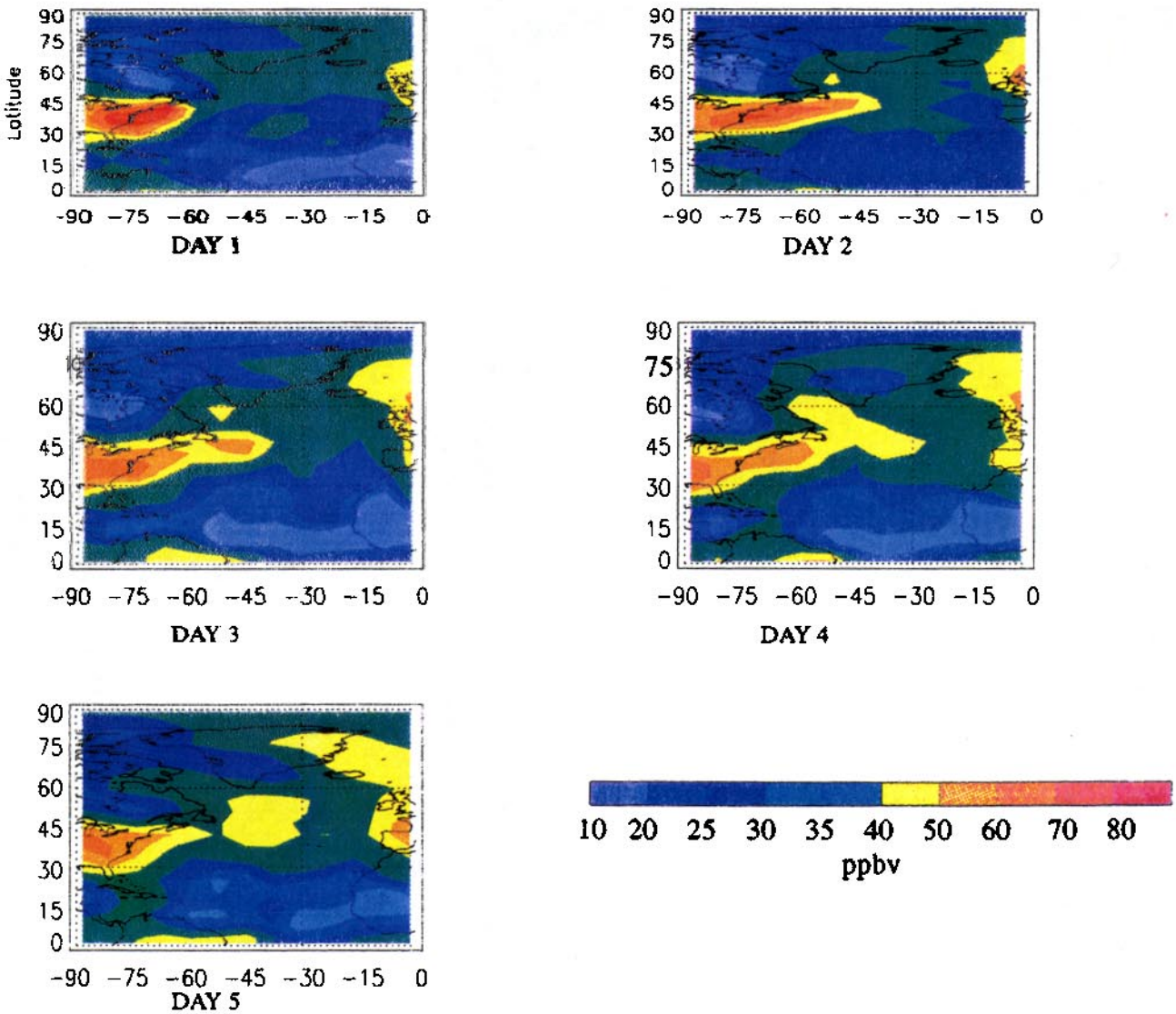
Modeling the Global Transport of Tropospheric Ozone

Ozone (O_3) is a key trace gas in the troposphere. Both ozone and the hydroxyl radical (OH), whose formation is inititated by the photolysis of ozone, help regulate the atmosphere's oxidizing capacity. Tropospheric ozone can also act as a greenhouse gas. Tropospheric ozone is formed in-situ and transported from the stratosphere. In situ formation occurs when carbon monoxide (CO), methane (CH_4), and non-methane hydrocarbons react in the presence of nitrogen oxides (NO_x) under sunlit conditions. These precursors have important biogenic and anthropogenic sources, including fossil fuel combustion. The results below show O_3 concentrations, in ppbv, predicted by our three-dimensional, global model for a 5 day period in August over the North Atlantic Ocean.. The model shows the transport of "plumes" of ozone from North America across the Atlantic Ocean. Model simulations also show that decreasing the fossil fuel emissions of NO_x by 50% over North America could decrease the amount of tropospheric ozone over the North Atlantic Ocean by as much as 30%, and decrease surface concentrations by 5 - 20 ppbv.



Cynthia S. Atherton (510) 422-1825 cyndi@tropos.llnl.gov
Atmospheric Science Division, Lawrence Livermore National Laboratory
Joyce Penner (313) 936-0519 penner@engin.umich.edu
Dept of Atmospheric and Oceanic Science; Univ. Mich.; Ann Arbor, MI 48109-2143

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